

Upper Cervical Protocol to Reduce Vertebral Subluxation in Ten Subjects with Menieres: A Case Series

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ABSTRACT

Objective: To review the management outcome of upper-cervical protocol on ten patients diagnosed with Meniere's disease.

Clinical Features: Prior to the onset of symptoms all ten cases suffered neck traumas, most from automobile accidents, resulting in undiagnosed whiplash injuries.

Interventions and Outcomes: Chiropractic care for the reduction of subluxation was undertaken. Custom x-rays and analysis of the upper cervical vertebrae as developed by William G Blair DC were used to determine chiropractic listings of subluxation. Thermographs of the cervical spine were utilized

using a DTG-25 instrument. A Toggle adjustment was used to reduce the subluxation. The condition of Meniere's, which is poorly understood, responded favorably to chiropractic care using an upper cervical approach to reduce a specific subluxation complex.

Conclusion: It is possible that the true cause of Meniere's disease is not only endolymphatic hydrops as theorized, but that vertebral subluxation plays a role. Further study is recommended.

Key Words: *Chiropractic, Meniere's disease (syndrome), vertigo, dizziness, upper cervical, specific chiropractic, vertebral subluxation, adjustment, atlas.*

Introduction

Meniere's disease, or syndrome, is characterized by vertigo or dizziness, and some combination of four associated symptoms: nausea, inner ear pressure, low-frequency hearing loss and tinnitus. The cause of Meniere's disease is unknown, and the pathology is poorly understood.¹ The attacks of vertigo appear suddenly, last from a few to 24 hours, and subside gradually. The attacks are associated with nausea and vomiting. The patient may have a recurrent feeling of fullness in the affected ear and hearing in that ear tends to fluctuate, but worsens over the years. Tinnitus may be constant or intermittent. Some other symptoms often associated with Meniere's syndrome are nystagmus, brain fog, headaches, depression, neck stiffness, sinus pain and fatigue.

The disease is named after Dr Prosper Meniere, Chief of Medicine at the Imperial Institute for Deaf Mutes in Paris France from 1838 until his death in 1862. He wrote the first paper on the disease in 1861. Some famous people thought to have Meniere's include Alan Shephard, Vincent VanGogh,

Martin Luther, General Robert E Lee, Jonathan Swift, Max Bygraves and Julius Caesar.

The incidence of Meniere's has been estimated to range from 0.5 to 7.5 per 1000, most commonly affecting people in their 40s and 50s.² Females appear to show a slightly higher incidence of the disease. It is thought to affect white, black and oriental races equally. Patients with dizziness comprise a large portion of patients seen in emergency departments at 6.7%, and by primary care physicians at 2.6%.^{3,4}

Meniere's is diagnosed by first eliminating other possible causes of vertigo. Blood work is done to rule out inner ear infection. MRIs are taken to check for possible tumor or evidence of multiple sclerosis. An audiogram is performed to test low frequency hearing loss. An electronystagram is often performed, injecting alternating hot 111° F and cold 86° F water and air into the ear. This test typically causes the patient

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to become nauseous. Electrocochleography is considered the most objective test for Meniere's disease.⁵ A needle is inserted through the eardrum and wired to an oscilloscope. A series of ticks are introduced into the ear through a headphone and a graph of the response is made.

Patients diagnosed with Meniere's are advised to restrict salt in their diets, and to avoid nicotine and caffeine. Diuretics such as Dyazide may be prescribed to reduce salt; and Triamterene to retain potassium. Antivert is prescribed for the vertigo. Antihistamines are routinely used to reduce head congestion. Anticholinergics are used to allay nausea. Some combination of barbiturates, antidepressants or sleeping pills is generally prescribed. Gentamycin may be injected into the middle ear to destroy hair cells.

If symptoms are not controlled with drugs, surgery may be considered. Endolymphatic subarachnoid shunts are found to be 59% effective. Less commonly, a variety of sac incision operations are performed. They are successful 45% of the time, but result in profound or total hearing loss in 4.3% of cases.⁶ Vestibular neurectomy may be performed. Labyrinthectomy is effective in eliminating symptoms, but also destroys hearing.

The term *endolymphatic hydrops* is used interchangeably with Meniere's disease and Meniere's syndrome in the literature. Although the underlying etiology of Meniere's is unknown, a consistent finding is *hydrops* to indicate dilation of the endolymphatic spaces. It appears that fluid build-up in the endolymphatic space, caused either by overproduction or reduced absorption, exposes hair cells responsible for sensing movement and balance to progressive damage or paralysis.⁷ Another theme in reports on etiology and pathology of Meniere's disease is an increase in immunoglobulins both in the endolymphatic fluid and in serum. This would suggest an underlying infection, probably viral, or autoimmune component with this condition.

Both the vestibular and cochlear nerves join the internal auditory meatus to form CN VIII, which enters the brain stem at the cerebello-pontine angle. Meniere's is considered a common peripheral ailment, however it is often overlooked that although within the substance of the brain itself, the root entry zone of the eighth cranial nerve is considered a peripheral vestibular structure.⁸ An atlas subluxation may irritate this nerve root by compromising the size of the neural canal space.⁹ Rosenberg reported a case of cervical cord impingement observed with magnetic resonance imaging, bringing on signs and symptoms of medulla compression.¹⁰

Also, dizziness related to perturbations in information received from proprioceptors in the neck that feed into the vestibular system, are not usually taken into consideration.¹¹ Such proprioceptive insult is a common result of even minor whiplash injuries. One theory has proposed that irritation of sympathetic nerves can elicit spasms within the vertebral artery, leading to decrease in blood flow to the brain stem.¹² The vertebral arteries reach the interior of the skull by ascending through the transverse foramina of the cervical vertebrae, turning medially along the upper surface of the posterior arch of atlas and then penetrating the posterior atlanto-occipital membrane and the underlying dura to enter

the subarachnoid space.¹³ Subluxation of the atlas may diminish blood flow through the vertebral arteries and their intracranial branches which supply the spinal cord, CN VIII, medulla, cerebellum and inner ear via the labyrinthine artery.

Finally, internal pressures of the body—specifically that of the cerebrospinal fluid—are rarely taken into consideration. The fluid spaces of the inner ear are connected to the CSF by the cochlear aqueduct, believed to be patent in most humans. Thus pressure changes in CSF are transmitted directly to the ear.¹⁴

The tensor veli palatini and salpingopharyngeus muscles control the auditory tubes, responsible for equalizing pressure in the middle ears with the atmosphere. These muscles are innervated by the pharyngeal nerve plexi which have a contribution from Cranial Nerve XII. The hypoglossal canal lies under cover of about the middle of each occipital condyle, intimate to atlas. Therefore, an atlas subluxation could furthermore interfere with a tubal function.

Most normal individuals cannot appreciate the devastating impact of vertigo. The patient perceives that the world is spinning around them. Vertigo disrupts every aspect of life since the patient loses the ability to do anything normally, especially when movement is involved. It can totally incapacitate the individual, often confining them to bed. Vertigo is to dizziness what migraine is to headache.

This report describes the results of ten patients suffering from Meniere's who all experienced dramatic improvement after their first or second upper cervical adjustment to reduce an Atlas subluxation.

Methods

The technique utilized is based on the work of Dr. BJ Palmer as developed at his Research Clinic at Palmer Chiropractic College in Davenport, IA, from the early 1930s until his death in 1961.^{15,16,17} Techniques also include the vertebral subluxation pattern work of his clinic director, Lyle Sherman DC, for whom Sherman College of Straight Chiropractic, Spartanburg, SC is named.¹⁸

In each case a detailed case history was taken on the first visit, followed by a spinal examination including cervical motion palpation. A report of findings was given, recommending a set of five cervical x-rays when evidence of an upper cervical subluxation was discovered in each patient. Custom x-rays and analysis of the upper cervical vertebrae as developed by William G Blair DC were used to determine chiropractic listings of subluxation.¹⁹ A scout series composed of Base Posterior, A-P Open Mouth and five-degree rotated Lateral Cervical views was used to determine the optimum angles from which to observe the atlanto-occipital and apophyseal articulations. An articular series that included Blair Oblique Protracto-views of each atlanto-occipital articulation was then taken based upon these calculations.

Dr. Blair began to develop his distinctive method for the analysis and correction of subluxations of the cervical spine soon after graduating from the Palmer School of Chiropractic and establishing his practice in Lubbock, Texas in 1949.

Trained in the classical upper cervical specific *Hole In One* method, he soon became concerned with the potential effects of osseous asymmetry or *malformation* on the accuracy of the traditional spinographic analysis in producing a valid adjustive listing. His observations of skeletal specimens also led him to conclude that the prevailing view of misalignment of atlas in relation to the occiput was inaccurate. He found that the atlas could not move in a truly lateral direction because the slope of the lateral masses and the condyles created an osseous locking mechanism preventing such motion; and atlas could not rotate in relation to occiput in the coronal plane without causing a gapping of the atlanto-occipital articulations due to the complementary shapes of the articular surface of the occipital condyles and the lateral masses.²⁰

The Base Posterior view was used to plot and measure the convergence angles representing the longitudinal axis of the respective atlanto-occipital articulations. The A-P Open Mouth view was used to study lateral deviations of the neural rings, which may cause brainstem pressure. Blair Oblique Protracto-views of each atlanto-occipital articulation were made with the patient turned in a positioning chair and then secured in head clamps at an angle equal to the convergence angle of the articulation being studied, so that the central ray was directed obliquely anterior-to-posterior along the convergence angles respectively.



Figure 1
SHOWS CONDYLE CONVERGENCE ANGLES NECESSARY TO TAKE RIGHT AND LEFT BLAIR PROTRACTO VIEWS

In this manner the antero-lateral (distal) margins of each of the articulations were clearly imagined and trichotomously classified as being either juxtaposed, overlapped where atlas

lateral mass margin was more anterolateral than condyle margin, or underlapped where lateral mass margin was less antero-lateral than condyle margin.

These appositional judgments of each articulation may then be combined to deduce the actual unilateral or ambilateral misalignment pathways of atlas in relation to occiput, and an anatomically accurate misalignment listing and adjustive formula may thus be derived.²¹



Figure 2
RIGHT BLAIR PROTRACTO VIEW EXHIBITS ALIGNMENT OF THE CONDYLE-LATERAL MASS EDGE. THIS WOULD BE LISTED AS EVEN

There are only four atlas listings under this system— anterior and superior on either the right or left, or posterior and inferior on either the right or left. Using the anterior tubercle of atlas as the reference point, considering the rocker configuration of the atlanto-occipital articulation, if atlas moves posterior then it must also move inferior.²²

Detailed leg checks were performed on each patient visit, utilizing the work of J Clay Thompson DC and Clarence Prill DC.^{23,24} With patient prone, they were instructed to first turn their head right and then left, then back to center. Any change of relative leg length was noted and considered evidence of upper cervical subluxation. A straight downward *piston* motion of the short leg was considered evidence of an atlas subluxation. However, if a slight lateral movement were notated during the downward sweep, evidence of an axis subluxation would be considered.

What causes one leg to appear shorter than the other and to change relative length when the head is turned while the patient is lying down, not upright in gravity? One subluxation

complex hypothesis proposes that the mechanism of fixation involves impingement of the atlanto-occipital intra-articular fat pad causing reflexive guarding contraction of the suboccipital muscles. Stimulation of the spindles in these muscles are thought to be involved in the initiation of tonic neck reflexes that alter global extensor muscle tone to achieve proper body balance in response to head movement.²⁵

After initial testing, the patients were led through a cervical range of motion and then all tests were repeated. A conservative approach in determining evidence of subluxation was used. That is, when in doubt no adjustment was given. The leg checks were the main criterion used to decide when to adjust or not. To determine whether the major subluxation was at the level of atlas or axis, Prill-modified leg length tests were utilized. With patient prone, patient was instructed to gently and steadily raise their feet toward the ceiling, while the doctor resisted such movement with his hands. The peripheral nerves were being tested, those that innervate the postural muscles holding one upright in gravity, so it was imperative that the patient only lift their legs slightly and maintain this pressure for at least two seconds. This test was for the top cervical vertebra.

Instructing patients to rotate their feet while the doctor provided resistance, tested axis. Some clinicians prefer to have the toes rotate outward. I have the patient pull their heels together. This corresponds to the rotation of the head on the neck, 50% of which occurs at the level of C2.

Thermographs of the cervical spine were utilized on two of the patients using a DTG-25 instrument. These were used to develop a pattern of subluxation in order to determine when to adjust. A graph reading that is static and persistent over time is considered to be the patient's *pattern*.²⁶ Duff found after recording over 35,000 comparative full-spine scans that no constant static deflection or bilateral asymmetry in skin temperatures can be found below the C2 level of the spine when the upper cervical region is in its proper juxtaposition and not subluxated.²⁷

When it was determined that the patient was in a pattern of subluxation, a toggle recoil adjustment was performed on atlas, with the patient in a side-posture position on a Thuli chiropractic table, using the cervical drop piece. The patient was then rested for twenty minutes and rechecked, to make sure that the pattern had been broken. All ten patients were adjusted on the second visit, after it was found that they were in a pattern of subluxation. They were rested, rechecked, and found to be balanced. They were checked one week later. Nine were balanced, so no adjustment was given. One was given a second adjustment and presented balanced one week later. Most are now under maintenance care, being checked on a monthly basis.

Case Reports

Case 1

History

This 87 year-old female had suffered frequent episodes of

vertigo, tinnitus and nausea for 45 years. She was in a moderate car accident a few years before onset. During episodes, she walked around her home holding onto the walls, trying to keep her head level at all times. She reported numerous falls over the years, some resulting in broken bones.

She was diagnosed with Meniere's disease at University of Michigan Hospital in Ann Arbor and Memorial Hospital in Chicago. She tried a variety of medications which would help her sleep, but did not negate her symptoms. Surgical history of colostomy and right radical mastectomy noted. Four or five years prior to the onset of symptoms, she was a passenger in a car that rear-ended another stopped vehicle while traveling approximately 45 mph.

Examination

Subject reported severe dizziness, blindness in the left eye, fullness in right ear, pain and stiffness of the neck and numbness in the left thumb. She was unable to lift her left arm above her shoulder. Exhibited limited range of motion with left lateral flexion and left rotation of the head. Edema was noted below the posterior base of the skull in the area of atlas. Leg checks showed a 1" right pelvic positive and 1" left cervical syndrome. Positive modified Prill check indicated C1 subluxation. Cervical x-rays revealed narrowed disc spaces at multiple levels, particularly evident at C6-7 with minimal marginal spurring and bony overgrowth of facet joint margins. Atlas was subluxated posterior and inferior on the left articulation and under lapped on the right. Fifth cervical vertebra was inferior and posterior.



Figure 3

DEMONSTRATES AN UNDERLAP OF THE SUPERIOR LATERAL TIP OF THE LATERAL MASS IN COMPARISON TO THE LATERAL INFERIOR TIP OF THE OCCIPITAL MARGIN. THE LISTING IS PIR (POSTERIOR AND INFERIOR ON THE RIGHT)

Case 3

History

Thirty five year old female presented with history of vertigo, swallowing difficulties, nausea, cervicalgia, cephalgia, double vision, occasional deafness, weakness and fatigue since 1996. She was working part-time out of her home, unable to drive or go anywhere. She reported having a minor car accident in 1991. Diagnosed with Meniere's disease, TMJ dysfunction, rheumatoid arthritis and Arnold-Chiari malformation. Prescriptions included Duricef, Retin-A, Benzymicin and Antivert. Her father had been diagnosed with Becker's muscular dystrophy.

Examination

Leg checks demonstrated 1" right pelvic negative, 1" left cervical syndrome and positive C1 and C5 tests. Restricted range of motion with left lateral flexion. X-rays, video fluoroscopy and MRIs showed atlas to be inferior and posterior on left articulation, under lapped on the right, and inferior and posterior C5 and C6. Thermograph showed pattern of a break to the left at levels of C1 and C5.

Intervention and Outcome

Within 24 hours of first specific Atlas adjustment all symptoms had subsided except dysphagia, which had gotten worse. All balance tests were negative and cervical thermograph was straighter.

Full cervical range of motion was restored. Atlas adjustment has been repeated when the pattern of subluxation has returned, a total of six times in the past two years. The swallowing problem has persisted. A C5 adjustment has been suggested but declined by the patient.

Case 4

History

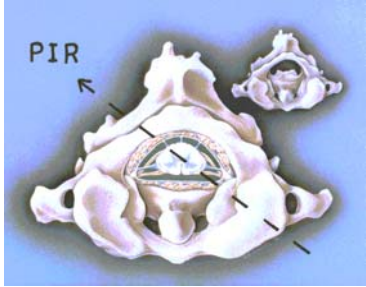
Fifty six year old male on total disability since 1995, after being diagnosed with Meniere's at the Michigan Ear Institute, Farmington Hills, MI. Averaging two severe vertigo spells per month. Hearing loss in left ear. Rear ended by car traveling at 45 mph in 1980. Open-heart surgery in 1998.

Examination

Subject reported dizziness, headache and stiff neck. Leg checks showed 1/2" left pelvic negative, 1/2" right cervical syndrome, 1" positive modified Prill tests for C1 and C5. Blair x-ray analysis determined that atlas was subluxated posterior and inferior with right laterality.

Intervention and Outcome

Patient post-checked showed balanced after specific adjustment and a twenty minute rest period. He called the next day to report an *unusual* type of headache.



Intervention and Outcome

Immediately following specific atlas adjustment, subject reported complete alleviation of vertigo and dizziness. When she awoke the next morning, the tinnitus was also gone. She held the adjustment and was symptom free for two years. Cervical range of motion was improved. After suffering a minor stroke closely followed by three compression fractures caused by osteoporosis, the subluxation returned and a second adjustment was given. That adjustment held for six months.

Case 2

History

Fifty seven year old female was diagnosed with Meniere's disease in 1991. Onset was sudden and severe wherein she reported being paralyzed for a short time. Following this episode, she gave up driving. She was a passenger on a bus that was in a relatively serious accident in 1975. Symptoms were relieved for two years by endolymphatic shunt surgery. Recent tests revealed a 50% hearing loss in right ear. Symptoms were currently returning most mornings and lasting into the afternoon. They were relieved by diet pills, Valium and bed rest. She decided to try chiropractic as an alternative to a second shunt surgery.

Examination

Patient reported dizziness, nausea and stiff neck. Leg checks demonstrated 3/4" right pelvic negative, 3/4" right cervical syndrome and positive C1 test. Limited range of cervical motion was observed bilaterally. Cervical thermograph showed right break at level of C1. X-ray analysis revealed atlas subluxation to be posterior and inferior on the left articulation, under lapped on the right.

Intervention and Outcome

After specific atlas adjustment and rest, patient was post-checked. She was balanced, all tests were negative and all symptoms were gone. Cervical range of motion was restored. Cervical thermograph was straight. After one year, patient is holding adjustment and symptom free.

He was re-checked and found to be in a pattern of subluxation. It was determined that I had accidentally adjusted him on the wrong side, the left instead of the right side up. The adjustment was repeated on the correct side. He was checked and was balanced the following day. The dizziness, headache and stiff neck were gone, and he said that his wife remarked that his voice had changed.

One week later he was still holding his adjustment. His symptoms had not returned. He was excited that he could walk four times farther and his allergies were greatly diminished, even though the pollen count was high. He reported feeling *different*.

Case 5

History

Thirty five-year-old mother of five was diagnosed with Meniere's five years ago, averaging three episodes a month putting her down in bed and out of work. Hearing was decreasing in right ear. Prescriptions include Buspar, Effexor, Prozac, Allegra, Rhinocort, Transderm scopolamine, Dyazide, Antivert, Valium, Phenergen and Triamterene. Appendectomy and ovarian cyst on her left side were removed 1983.

Remembers having her neck severely twisted and hearing a loud pop when she was in college.

Examination

Patient reported feeling dizzy. Having trouble hearing with right ear for some time, and left was also becoming a problem. Leg checks demonstrated ½" left pelvic positive, ½" right cervical syndrome and positive modified Prill test for C1. Limited range of motion with left lateral flexion and left rotation. X-ray analysis showed atlas posterior and inferior on the left.

Outcome

Patient was balanced and symptom-free after first adjustment. She has held her adjustment for over three months with no vertigo spells. She also feels that her hearing has improved.

Case 6

History

Fifty five year old female diagnosed with Meniere's three years prior at the ENT Center, Durban, South Africa. Her attacks initially were every 6 months, but more recently she had been having weekly attacks with vertigo, progressive hearing loss and vomiting. History of carpal tunnel syndrome, low blood pressure and hypothyroidism.

Audiogram showed a right moderately severe sensorineural hearing loss. Prescriptions included Hygroton, Serc and Stemetil.

Examination

Patient reported loud buzzing in right ear. Leg checks showed ¼" right pelvic positive and positive C1 modified Prill test. X-rays revealed atlas to be posterior and inferior on the left.

Intervention and Outcome

Patient discontinued medications the day of adjustment. Two days later the post-check was balanced. She reported no dizziness, but that the tinnitus was a little worse. Unfortunately, she had a severe attack two months later after she had returned to South Africa.

Case 7

Case History

Fifty four year old male diagnosed with Meniere's in 1992, TMJ in 1994, irritable bowel syndrome 1995 and a sleep disorder in 1996. He hit his head very hard on an air duct while descending basement stairs in 1989.

Examination

Patient reported left ear ringing and fatigue from inability to sleep for more than two consecutive hours. Leg checks showed 1" right pelvic positive, 1" left cervical syndrome and 1" modified Prill C1 test. X-ray showed atlas to be posterior and inferior on the right.

Intervention and Outcome

Atlas was adjusted on second visit. Patient was balanced and considered himself cured on third visit.

Case 8

History

Forty six year old male diagnosed with Meniere's seven years prior. Four injections of Gentamycin into left ear in 1998. Taking Valium, diuretics, Dyazide and Mescaline. Hernia operation in 1997, deviated septum operation in 1999.

Examination

Patient presented with dizziness, unsteady on his feet, ringing and fullness in left ear. Leg checks showed ½" left pelvic negative, bilateral cervical syndrome and positive C1 Prill test. X-rays revealed atlas to be posterior and inferior on the left.

Intervention and Outcome

Specific adjustment was given to atlas. Patient returned two days later balanced and reporting that the previous day was a really good day.

Case 9

History

Ninety-year-old male got left inner ear destruction at Mayo Clinic in 1963. Nine years ago Meniere's symptoms returned, this time in right ear. Heart valve replacement and right ear endolymphatic sac decompression in 1995. Pacemaker in 1998 and Gentamycin intra-ear injections in 1999.

Examination

Patient reported dizziness and inability to hear because his hearing aid was broken. Leg checks showed 1" right pelvic positive, 1 ½" right cervical syndrome and 1" modified Prill test.

X-Rays revealed atlas to be posterior and inferior on the left.

Intervention and Outcome

Atlas was adjusted. One week later patient returned balanced with no dizziness or vertigo. Hearing had improved dramatically in remaining ear.

Case 10

History

Seventy eight year old male diagnosed with Meniere's in 1992. Prostate surgery for cancer in 1993. Was in car accident in 1987.

Examination

Patient presented with right ear fullness, stiff neck and low back pain. Leg checks showed 1" right pelvic positive, 1" right cervical syndrome and positive Prill C1 test. X-rays demonstrated atlas to be posterior and inferior on the left.

Intervention and Outcome

One week after specific atlas adjustment, patient presented balanced and symptom free.

Discussion

Nine out of ten case study patients reported a history of neck trauma, mostly automobile accidents. All ten showed evidence of upper cervical subluxation upon neurological examination, and all exhibited both evidence of a history of whiplash and an existing atlas subluxation in radiographs. All had posterior and inferior atlas listings, with atlas laterality on the opposite side of the involved ear.

It is possible that the lateral mass of atlas on the opposite side of the posterior listing is irritating the nerve root of CN VIII, as it exists from the upper lateral portion of the medulla oblongata, just anterior to the midline of the brain stem. BJ Palmer's research demonstrated that the brain stem extends

below the foramen magnum, to the level of the second cervical vertebra, axis. Although this is not commonly accepted, other less direct biomechanical forces may be irritating the area.

The nerve root may be superior to the foramen magnum, but the CN VIII nucleus can bridge the medulla/spinal cord region.²⁷ John D. Grostic, DC has proposed a theory that misalignment of C1 or C2 can produce neurological insult via mechanical irritation of the spinal cord by means of the dentate ligament.²⁹

Gary Hack, DDS, Professor of Dentistry at the University of Maryland Dental School, has discovered a physical connection between the deep neck muscles and the covering of the brain and spinal cord. He has dissected a muscle-dura tissue bridge that connects the base of the cranium and the first cervical vertebra to the dura.³⁰

Other theories suggest that the primary neurological interference in the upper cervical area is not caused by this *medulla traction*, but by afferent input into the cord from the subluxated facets.

There are several upper cervical subluxation complex models to choose from. None have been shown to be more valid than another. The clinical results warrant additional investigation.

From 11 countries, many clinicians both chiropractic and medical report cases in which cervical manipulation to correct functional spinal pathology has cured tinnitus and improved hearing, often in cases where the auditory problems have followed motor vehicle whiplash injuries. The great majority of cases involve the upper cervical spine.³¹ Medical research has established a connection between spinal trauma and numerous neurological conditions besides Meniere's disease, including Multiple Sclerosis, Parkinson's disease, Amyotrophic Lateral Sclerosis, Trigeminal neuralgia, epilepsy and migraine headache.^{32, 33}

Physicians often make the mistake of thoroughly examining only the area of chief complaint. When relevant, I believe it is prudent to start at the nucleus of the cranial nerve or center that supplies function to that area. For example, the brain stem for balance disorders (CN VIII), irritable bowel syndrome (CN X, Vagus), high blood pressure (vasomotor center) and sleep disorders (reticular formation).

It is possible that when the top cervical vertebra partially slips off from one of its two articulations, it puts a small amount of pressure on the spinal cord where it meets the medulla oblongata, irritating it after a period of time.³⁴ In the case of whiplash, the symptoms are usually exaggerated by an additional lower cervical subluxation.

Conclusion

A case study is limited in its ability to provide conclusions. It is possible that the patients recovered through spontaneous remission or because they believed their problems had been discovered and improved, creating a placebo effect. The time span before chiropractic intervention and the long-term clinically-documented neurophysiological improvements after

initial adjustments weigh against such possible effects. In addition, these were ten consecutive Meniere's patients who had posterior and inferior atlas listings with laterality on the opposite side of ear involvement.

All patients with a history of vertigo or dizziness should be questioned about a history of trauma, especially whiplash from an automobile accident, contact sports injury, or serious falls. Patients often forget these accidents, thinking that they were not hurt because they did not break any bones and were not bleeding. Patients with a history of both vertigo and trauma should be referred to an upper cervical specific chiropractor for examination.

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